

## LEAVES FROM THE NOTE-BOOK OF A BELLEVUE NURSE

### LECTURE V.—SECRETIONS—DIGESTION—ABSORPTION

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#### SECRETIONS

SECRETIONS are fluids that do not exist in the blood or body, but are formed by certain membranes or glands from material found in the blood. They have a specific action in carrying on the vital forces, and when the action is over they are reabsorbed into the blood in the form of the substance from which they were first formed. They are as a rule secreted not continuously but intermittently.

#### *True Secretions*

(1) Synovia; (2) Mucus; (3) Serum; (4) Sebaceous matter; (5) Cerumen; (6) Milk and Colostrum; (7) Tears; (8) Saliva; (9) Gastric juice; (10) Intestinal juice; (11) Pancreatic juice; (12) Bile.

**SYNOVIA.**—Synovia is the fluid that lubricates the joints. It is secreted by a smooth membrane and is very viscid, alkaline, colorless or pale yellow. These membranes are called synovial, and exist in the body in three forms, articular, bursal, and vaginal (synovial sheaths).

**MUCUS.**—Mucus is a fluid of a semi-opaque character and is alkaline. It is secreted by the mucous membrane, which lines cavities of the body that open into the external air. It contains an organic principle (mucin) that is imperfectly coagulated by heat, but readily so by acetic acid and to a less extent by the mineral acids. The latter in excess redissolves it. This fact must be remembered in examining urine, as mucin is often mistaken for albumin.

The uses of mucus are principally mechanical—lubricant and protective; but it likewise prevents the absorption of venom. The venom of reptiles and insects swallowed is not poisonous for that reason.

**SERUM.**—The serous membranes line the closed cavities of the body and normally secrete a thin fluid in sufficient quantity merely to moisten the surface and prevent friction.

**SEBACEOUS MATTER.**—This is an oily secretion, secreted by glands that exist in all places in the skin that contain hair, and these glands are usually connected with a hair follicle. The uses of this sebaceous matter are for lubricating and softening the skin and hair and preventing absorption by the unbroken skin. The skin of a foetus at birth is often covered by a white, oily substance (vernix caseosa), which

is sebaceous matter secreted by these glands. The Meibomian secretion is likewise an oily substance like sebaceous matter, and is produced by little glands along the edges of the eyelids, and prevents the overflow of tears on the cheeks.

**CERUMEN.**—This secretion, semi-solid, is of a peculiar waxy nature, very bitter, and is secreted by small glands found in the external ear. It is for lubricating and protection, and its bitter taste prevents insects entering the ear.

**SALIVA.**—This is a viscid fluid secreted by the salivary glands that are situated in the mouth and throat. There are three large ones, parotid, submaxillary, and sublingual, and many small ones. There are about forty-five to fifty ounces of saliva secreted in twenty-four hours. It is alkaline, its specific gravity is 1004 to 1008, and it is composed of an organic substance,—ptyalin or diastase,—inorganic salts, and water. The uses of the saliva are to keep the mouth moist, to facilitate speech, and to moisten food and make it easy to swallow. In addition to these mechanical qualities it begins the digestion of starch. This action is due to the ptyalin.

**GASTRIC SECRETIONS.**—The mucous membrane of the stomach contains glands, and these glands have cells that secrete the gastric juice. The action of these cells, like that of the salivary glands, is intermittent, being induced by the stimulus of food. The stomach has an external serous coat, a middle or muscular coat, and an internal or mucous coat. The muscular coat undergoes peristaltic contractions during digestion and forces food into the duodenum. The stomach has two openings, cardiac and pyloric. The capacity of the stomach is five to eight pints.

**GASTRIC JUICE.**—This is a thin, yellowish fluid; it is acid in reaction, and is composed of two organic substances, pepsin and rennet ferment, and a free acid, hydrochloric. Besides these ingredients there are several salts and water.

Foods that are taken into the stomach are divided into three classes, viz.: (1) albuminoids or proteids—eggs, meat, casein, vegetables; (2) carbohydrates—sugar, starch, oils, and fats; (3) inorganic substances—phosphates, iron, etc. As has been said, starches are acted upon by the saliva, but are not acted upon to any extent beyond hydration by the gastric juice. Salt may be decomposed and absorbed by gastric mucous membrane. The chief action, therefore, of the gastric juice is upon proteids. Many foods, as oatmeal, rice, bread, etc., contain both starch and vegetable proteids. Pepsin and rennet ferments are not directly formed by the cells of the glands, but in the intervals of digestion are stored up in the form of an antecedent substance, zymogen. When proteids are taken into the stomach digestion begins, then the

zymogen is poured out upon the food and there meets free hydrochloric acid, which converts it into an active ferment. Pepsin and rennet ferments, in conjunction with hydrochloric acid and water, begin to act on the proteids first, hydrating them and then changing them into an acid albumin or syntonin. Then by further digestive action they are changed into primary and secondary proteoses, and by further action into peptones, and are then ready for absorption and assimilation. This process is called gastric digestion. The rennet zymogen is likewise converted into active ferment by hydrochloric acid, and its use is to act upon casein of milk and prepare it so that pepsin can digest it.

It can be seen, therefore, that the principal action of the gastric juice is to act upon the proteids, digesting completely some of these, and preparing the others for the action of the intestinal juices. The duration of gastric digestion is from two to four hours. Many things modify this, as fever, nervousness, etc. There are many proteids that are easily digested, as milk and eggs (raw and soft boiled). Fish, lamb, beef, and mutton are the easiest meats to digest, while pork and veal are very hard to digest. Stomach digestion is not entirely essential to life, as by actual experiment it has been proven that the stomach can be done away with and yet life be preserved.

**INTESTINAL JUICES.**—The small intestines are about twenty-five feet in length and are composed of three coats,—external (serous), middle (muscular), and internal (mucous).

There are three different and distinct fluids forming the intestinal juice, viz., intestinal, pancreatic, and bile. The first is secreted by the glands in the mucous membrane and has comparatively little action in digestion. The second, or pancreatic juice, is the most important part of the intestinal juice as far as digestion is concerned. It is secreted only during digestion by the pancreas, an organ situated just back of the lower border of the stomach, which is about six inches long and weighs from two to four ounces. The pancreatic juice is viscid, clear, and alkaline, and is composed principally of three organic substances, amylopsin, trypsin, steapsin, and some inorganic salts. These organic substances are ferments, and are stored up in the pancreas in the form of a zymogen or antecedent ferment, and when poured out into an alkaline medium become active ferments. The pancreatic juice by virtue of these substances has three distinct actions, viz.: the amylopsin digests sugar and starch, converting them into glucose, the trypsin finishes the digestion of proteids coming from the stomach, and the steapsin acts upon oils and fats, converting them into a fine emulsion, so that they can be absorbed by the lacteals and then be assimilated.

(To be continued.)